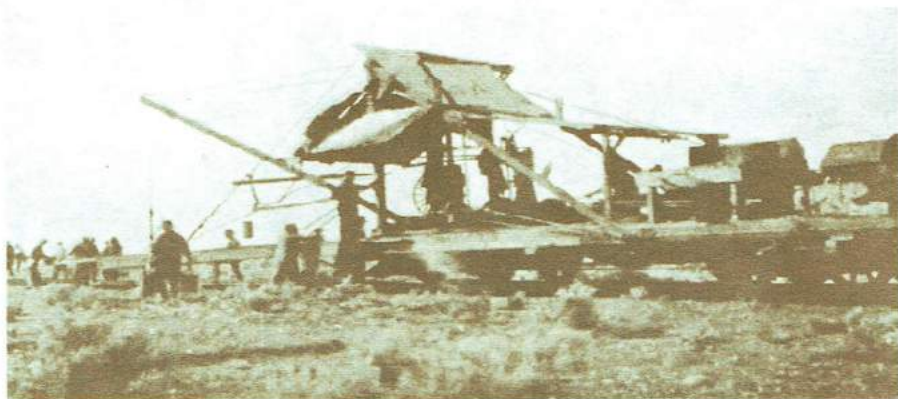




The
Institution of Engineers,
Australia

Western Australia Division

Trans - Australian Railway



National Engineering Landmark
Commemorative Plaque
Unveiling Ceremony

Kalgoorlie - Western Australia

Tuesday, 27 November 2001
Kalgoorlie Railway Station

Proudly presented by

***The Institution of Engineers, Australia
WA Division***



The
Institution of Engineers,
Australia

Program

Welcome

Mr Bruce James OAM Hon FIEAust CPEng
Chairman, Engineering Heritage Panel
WA Division
Institution of Engineers, Australia

Unveiling of the National Engineering Landmark

Mr Paul Robson
His Worship, The Mayor of the
City of Kalgoorlie-Boulder

Presentation of the National Engineering Landmark

Professor Peter Lee FIEAust CPEng
President, WA Division
Institution of Engineers, Australia

Acceptance of the National Engineering Landmark

Mr John Powell
Manager Country Passenger
West Australian Government Railways Commission

Morning Tea

The Trans-Australian Railway

National Engineering Landmark

"JOINED TOGETHER WITH BONDS OF STEEL"

When the Trans-Australian Railway joined eastern and western Australia in 1917 it provided a physical link which was to be of major commercial and strategic importance and which improved immeasurably the convenience and comfort of interstate travelers. The railway was also a symbol to all Australians of the bonds which had bound the colonies together in Federation.

The Trans-Australian Railway was the first major public work to be undertaken by the Commonwealth Government and at that time it was the largest construction project ever undertaken in Australia. It was built through some of the most inhospitable country to have been traversed by railway in Australia to that date, most of which country was largely uninhabited by Europeans and lacked adequate water supplies. It is still the longest railway ever built at any one time in Australia (1682 km).

The railway's construction operations were unique because, due to the lack of developed infrastructure along the route, the constructing authority had to arrange the complete supply logistics for up to 3000 men working on the railway, in addition to the supply of all the engineering plant and materials and the care of hundreds of horses and camels.

When it commenced operation, no other railway in the world was so completely self-contained. Commonwealth Railways ran its own farms and stores, and provisioned by rail the small communities along the line for which all the social and service infrastructure was provided. The railway had a number of unique operational features including the longest straight stretch of track in the world (478.193 km), and for twenty years from 1933, the longest run undertaken by coal burning steam locomotives, 867 kilometres from Cook to Kalgoorlie.

FEDERATION AND THE TRANSCONTINENTAL RAILWAY

Although the Commonwealth's founding fathers and leading politicians, Deacon, Barton, Forrest, Kingston and Reid, had all spoken before 1900 in favour of the railway as an important symbol of Federation, its political genesis was to prove far more prolonged than any might have expected.

John Forrest was one of the first politicians to publicly promote an east-west transcontinental railway when, in 1888, he suggested that its construction should be one of the conditions required by Western Australia for joining an Australian Federation. For the next 25 years he seldom missed an appropriate opportunity to advocate construction of the railway. During Forrest's period as Western Australian Premier throughout the 1890s, most of his colleagues remained opposed to Federation. Even after the other colonies had voted for Federation in 1899 they still tried to include four amendments to the Constitution Bill, one of which was intended to facilitate the construction of the railway. But the eastern premiers were in no mood for last minute changes and the amendments were ignored. On 9 July 1900, the Commonwealth Constitution Bill received the Royal Assent in London, and on 31 July 1900, the citizens of Western Australia, in a referendum, voted by a large majority to accept the Constitution. Contrary to popular belief, it contained no provision for the future construction of a transcontinental railway.

In April 1904, Forrest, now a member of the Commonwealth Government, introduced the Trans-Australian Railway Survey Bill to the House of Representatives. The Bill eventually passed through the House later in the year, but its passage through the Senate proved more difficult, as Senators still voted according to State allegiances. Only the Western Australians and some of the Senators from NSW voted for the Bill. The Senate again rejected the Bill in 1905 and 1906 and threatened to continue to do so "until South Australia gave permission" for the line to be built. The impasse was solved by Prime Minister Alfred Deakin, in 1907, during his negotiations for the transfer of the

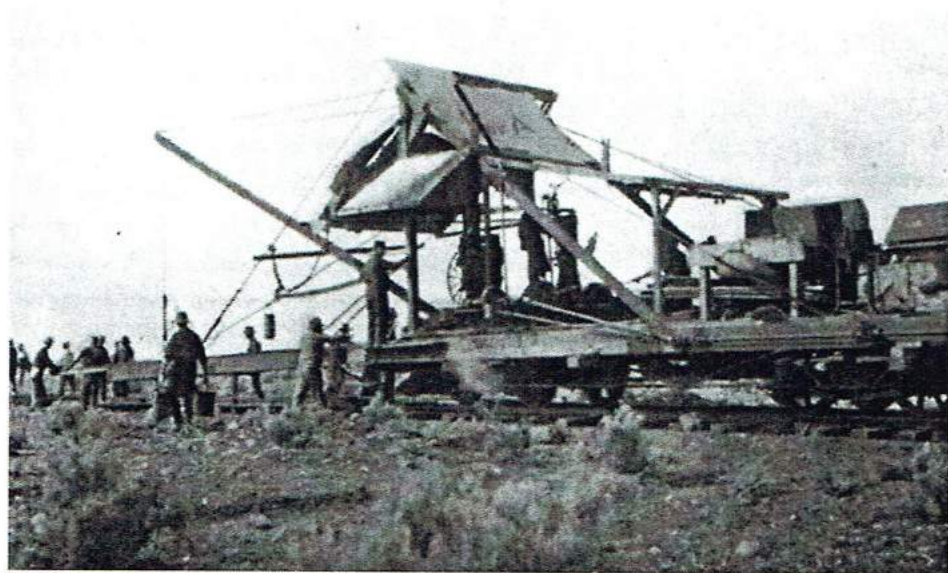
Northern Territory from South Australia to the Commonwealth. The South Australian Premier, Tom Price, wanted a promise of a north-south railway included in the agreement, and Deakin wanted assurances that the east-west line could proceed. So the Northern Territory Acceptance Bill included permission for the Commonwealth to build both lines through South Australian territory. Consequently, in an historic division at the end of 1907, Senators abandoned for the first time voting by State to pass the Survey Bill.

Survey work for the railway alignment began in mid-1904 with the route from Kalgoorlie to the State border being surveyed by the WA Government and the one from Port Augusta to the border by the SA Government. Richard Anketell, an engineering surveyor, led the Western Australian party, which consisted of three other surveyors, ten camelmens and assistants and 91 camels. Anketell set the alignment by compass, checking it by stellar observations and marking the route by means of a heavy 'snigging chain' drawn by one of his camels. The chaining, pegging and leveling party followed. Pack camels left 270 litre caches of water every eleven kilometres, and at each of these, a camel wagon party established an overnight camp. By the end of September, after only three months in the field, the party reached the border, where it built a cairn and then turned south for the small telegraph station settlement of Eucla. The South Australian survey party, under J.T. Furner, left Port Augusta in June 1908, and had to toil through the heat of the summer before reaching the border cairn in March 1909.

In September 1911, the Minister for Home Affairs in the Fisher Labor Government, King O'Malley, introduced the Kalgoorlie to Port Augusta Railway Bill, which after passing through both Houses, received the Governor General's consent on 12 December 1911. On January 1 1912, Henry Deane, the retired Engineer-in-Chief of NSW Government Railways, began work as Engineer-in-Chief of the new railway. He was faced with a huge task. He had to build a complex railway organisation from scratch and at the same time organise the largest construction project ever undertaken in Australia.

BUILDING THE RAILWAY

The quantities of material required to construct the railway were huge; 2 300 000 sleepers, 136 000 tons of rail and 10 000 tons of fishplates, plus all the other permanent way material such as dog spikes, sleeper plates, and turn-outs. Over 1030 working drawings for construction work and rolling stock standards had to be prepared. Tenders had to be called for the whole range of railway equipment and rolling stock, including locomotives, wagons, cranes, accommodation coaches and water tankers, and for construction materials such as cement, water pipes, and telegraph wires. Workshops, locomotive sheds and store sheds had to be built at Port Augusta and Kalgoorlie, for both 'temporary' use during construction and for later operational use.



RAIL

American and British mills were awarded the first contracts for rail supply in 1912, with G. & C. Hoskins, Australia's only steelmaker, receiving a smaller one. However, in January 1913, BHP commenced work on the construction of its Newcastle steelworks. In January 1915, the first shipment of iron ore, from Iron Knob in South Australia, arrived at the works, and on 24 April 1915, the first of 45000 tons of 80 lb steel rail produced by BHP for the Trans-Australian Railway was manufactured. The railway's requirements and the wartime disruption in steel supplies from Britain and the USA had launched BHP as a steel-maker.

SLEEPERS

All aspects of the tendering process were subject to intense political scrutiny, and none more so than that for the supply of sleepers. Western Australia was the only State which still had large areas of forest containing timbers suitable for sleepers. The State's timber industry was dominated by Millars' Timber & Trading Co., and the Scaddan State Labor Government was anxious to break the company's control over prices and to develop unworked karri forests. Although Deane considered jarrah to be the best sleeper timber, he was prepared to accept karri sleepers treated by powellising, a chemical treatment process. In April 1912, Scaddan announced the formation of the State Saw Mills, and commenced construction of mills at Manjimup and Pemberton. A contract for the supply of 1 400 000 powellised karri sleepers and 100 000 jarrah sleepers was finalised in August 1912.

The winter of 1913 was an exceptionally wet one in the south west, so the original date for the start of sleeper deliveries was extended. However, because of further delays, the new Cook non-Labor Federal Government cancelled the contract in February 1914. This could have had a disastrous affect on the railway construction programme, had not a further agreement been signed with the State Saw Mills. Deliveries began in July 1914.

WATER SUPPLIES

One of the major problems to be overcome during the construction of the railway, and also during its operation, was the lack of sufficient quantities of water of suitable quality. Along the first 270 kilometres east of Kalgoorlie, a number of dams were built to collect surface runoff but few were very reliable. East of 270 kilometres, across the limestone-saltbush country and the Nullarbor Plain itself, and through the Ooldea sandhills to around 1120 kilometres from Kalgoorlie, there is negligible run-off, and water had to be obtained from underground bores, but the quality of this water was far from satisfactory for use in locomotive boilers. At the eastern end of the line, water trains carted potable water to the inland depots from Depot Springs near Port Augusta and from two reliable underground sources.

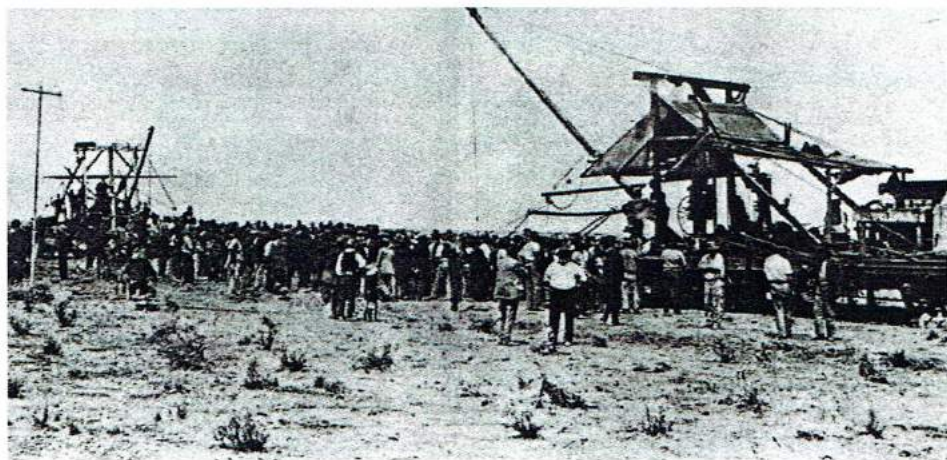
Six retired NSWGR locomotives were used to haul construction and supply trains until mid-1914 when twelve G Class locomotives were delivered. These latter locos had frequent boiler failures, and as the lengths to the railheads increased, they were worked to their limits. To reduce locomotive down time, intermediate loco depots were established for emergency repair work.

EARTHWORKS

Horse-drawn tumbling scoops were used extensively for earthmoving on the railway. Where more extensive cuttings were required, notably in the sandhills near Barton, excavation was done manually into side-tipping trucks. Several steam shovels were also used in major cuttings. A total of 3.8 million cubic metres of earthworks were completed for the railway.

The summer of 1913-14 was a critical time in the administration of the railway construction. The Cook non-Labor Government was attempting to reverse some of the Fisher Government's policies on railway management and sleeper contracts. Deane found himself under fire from both sides of Parliament, especially over a 'catch up' earthworks contract, which had been let to a leading contractor, Henry Teesdale Smith. By February 1913, Deane had had enough and resigned.

One of the first priorities of the new Engineer-in-Chief, Norris Garrett Bell, was to provide better living conditions and food for workers at the railheads and other workplaces, such as major earthworks, ballast pits and loco depots.



TRACKLAYING

One of Deane's last recommendations to the Commonwealth was that the line should be ballasted. To effect this, Bell established four ballast quarries and crushing plants along the line, but it was another twenty years before ballasting was fully completed. Almost all the mainline track was laid using two tracklaying machines obtained in 1912 from Roberts Brothers of Chicago. The two teams established Australian platelaying records which stood for nearly fifty years. These were:

Greatest length in any one day: 4.023 km
in any one week: 23.537 km.
in any four weeks: 75.035 km.

Crossing the Nullarbor in summer, the midday temperature often exceeded 45°C in the shade. Work was rescheduled for early morning and late afternoon, as all steelwork and tools became too hot to touch. The historic meeting of the two railheads occurred on Wednesday, 17 October 1917, near Ooldea, 691 km from Port Augusta and 1001 km from Kalgoorlie.

The final cost of the 1682 km long railway was £6 667 360, compared with Dean's figure of approximately £4million. Considering the large rise in the cost of materials and labour that occurred during the war, and the additional works involved, such as ballasting and heavier rail, to have completed the works for the final cost was a remarkable achievement.



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